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REPORT

OF THE

ORNITHOLOGIST AND MAMMALOGIST

FOR

1891.

BY

C. HART MERRIAM.

FROM THE REPORT OF THE SECRETARY OF AGRICULTURE FOR 1891.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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REPORT OF THE ORNITHOLOGIST AND MAMMALOGIST.

SIR: I have the honor to submit herewith my sixth annual report of the doings of the Division of Ornithology and Mammalogy, covering the year 1891. It consists of two principal sections, in accordance with the two lines of work carried on by the division—the one, a study of the geographic distribution of species; the other, a study of the economic relations of mammals and birds beneficial or harmful from a directly economic standpoint.

As stated in previous reports, the office force of the division is wholly insufficient for the rapidly increasing demands of the investigations in hand. During the year 1891 more than two thousand letters were written and several hundred circulars and schedules were distributed. During the same period the number of letters received was about four thousand, and many of these were accompanied by schedules, lists, reports, or other records of observations, which were examined and either filed for future reference or at once utilized in studies already in progress. Other routine work consisted in attending to the needs of field agents, in identifying specimens, comparing and correcting proof, filing reports received, typewriting franks for the distribution of documents to American and foreign correspondents, compiling a reference list of publications useful in the regular work of the division, and miscellaneous work.

Respectfully,

C. HART MERRIAM,
Chief.

Hon. J. M. RUSK,
Secretary.

WORK OF THE YEAR.

SECTION OF GEOGRAPHIC DISTRIBUTION.

The work in the section of geographic distribution may be conveniently summarized under two heads, namely, (1) office work and (2) field work.

(1) *Office work.*—The office work has consisted, as heretofore, in the preparation and publication of reports based on the investigations of the division, and in the arrangement and identification of specimens received from field agents and others. The study series of mammals and birds belonging to the division has been so largely increased during the year that the entire time of one clerk is necessary for the proper care of the collection.

During the year the results of a biological reconnaissance made in Idaho during the summer of 1890 have been published in North American Fauna No. 5. This report contains an account of the six life zones of

central Idaho and the characteristic species of animals and plants found in each zone, together with notes on all the species of mammals, birds, and reptiles at present known to occur in the State.

(2) *Field work.*—During the year field work has been carried on in southeastern Texas by Clark P. Streator and William Lloyd, field agents of the division, who were engaged in working up the subtropical fauna along the lower Rio Grande River and on the Gulf coast. Late in the spring Mr. Streator was transferred to northern Idaho and Washington, where he continued work begun during the summer of 1890. He afterward crossed the Cascade Mountains and commenced work in the Puget Sound region.

The most important work of the year has been a biological survey of a large area in southern California and southern Nevada. This region was selected because of the exceptional advantages it offered for studying the distribution of animals and plants in relation to the effects of temperature and humidity at different altitudes from the bottom of Death Valley, which is below the level of the sea, to the summit of the High Sierra, culminating in the lofty snow-capped peaks about Mount Whitney, at an elevation of nearly 15,000 feet.

The close proximity of precipitous mountains and deep desert valleys often brings near together associations of species which in a more level country are characteristic of widely remote regions. In one place on the east side of the Sierra all the life zones of the North American continent from the plateau of Mexico to the Polar Sea may be crossed in traversing a distance of only 10 miles.

The Death Valley Expedition, for it soon came to be universally known by this name, was organized for the purpose of determining the actual boundaries of the several life zones of the region and studying the problems involved in the laws governing this distribution. The expedition outfitted at San Bernardino, in southern California, the last week in December, 1890, and set out through Cajon Pass, January 3, 1891, bound for the Mohave Desert and the region to the northward. In its personnel it comprised some of the ablest and most experienced field naturalists in the world. Vernon Bailey, E. W. Nelson, Theodore S. Palmer, Dr. A. K. Fisher, F. Stephens, and Basil Hicks Dutcher, belonged to the division force, and each was in charge of a branch party at some time during the season.

By coöperation with the Division of Botany a competent botanist, Mr. F. V. Coville, and a botanical assistant, Mr. F. Funston, were detailed to accompany the expedition, and remained in the field throughout the season, making enormous collections of grasses and other plants, including many new species.

By coöperation with the Division of Entomology an experienced insect collector, Mr. Albert Koebele, joined the main party in the Mohave Desert early in April and remained nearly six weeks, making important collections in Death and Panamint valleys and in the Panamint and Argus mountains.

By coöperation with the Meteorological Division of the Signal Service of the War Department, since transferred (July 1, 1891) to the Department of Agriculture as the Weather Bureau, a meteorological station was established below sea level in Death Valley in April, where continuous observations were taken until the latter part of September. About the middle of June another station was established near timber line in the High Sierra (at a little above 10,000 feet altitude). The permanent station at Keeler, on Owens Lake (altitude 3,600 feet), in the heart of the region under investigation, served as a base station. Moreover, by

coöperation with the local State weather services of Nevada and California, the Weather Bureau has furnished records from several other stations in and adjacent to the area covered by the biological survey. Thus simultaneous meteorologic observations are at hand from a number of distinct and widely different localities, resulting in series of thermometric, barometric, and hygrometric data never before available in work of this character.

From the time the expedition took the field, the first week in January, until my arrival, the last week in March, Mr. Theodore S. Palmer was in charge; and he was again placed at the head about the middle of July, when I was unexpectedly called away on a special mission to Bering Sea, and remained in charge until the main party disbanded at Visalia, September 19, 1891.

The area of which a biological survey was made comprises about 100,000 square miles in southern California and Nevada, situated between the parallels of 34° 30′ and 38° north latitude. It comprises also a small area in northwestern Arizona and southwestern Utah, thus including all of the torrid desert valleys and basin ranges between the High Sierra and the Colorado Plateau. The great Sierra Nevada was crossed along four distinct lines, and both slopes were worked with considerable detail. The Mohave Desert was traversed in various directions, and was worked to its extreme western end. Some work was done also in the Tejon Mountains—the westward continuation of the Sierra—in the Cañada de las Uvas, the San Joaquin Valley, and the coast region in Monterey and San Luis Obispo counties.

Thus a broad zone, more than 200 miles in breadth and 500 in greatest length, stretching from the Pacific Ocean to the Colorado Plateau in Utah and Arizona, was covered by the operations of the division; and the survey of the present summer was practically connected with the biological survey of the San Francisco Mountain region in Arizona, made during the summer of 1889. (See North American Fauna, No. 3.)

The collections brought back to Washington by the Death Valley Expedition and deposited in the U. S. National Museum comprise about 1,000 reptiles and batrachians, 1,000 birds, 5,500 mammals, 4,500 insects, and 18,000 plants, besides a number of fishes and mollusks from the hot springs of some of the interior deserts, and several hundred miscellaneous specimens.

One of the special objects of the expedition was the determination of the northern boundary of the Lower Sonoran life zone in the Great Basin—a matter of considerable importance, because this zone marks the northern limit of successful raisin production and of the profitable cultivation of several subtropical fruits and other crops. The attempt to fix this boundary was undertaken with some misgiving by Mr. Bailey and myself, and was accomplished with great satisfaction after a horseback journey of about 1,700 miles. We succeeded in tracing the line in question completely across the deserts and barren ranges of the Great Basin all the way from the foot of the High Sierra in California to the foot of the Great Colorado Plateau in Utah; and later in the season other members of the expedition carried it northward along the west base of the Sierra.

The inexhaustible fertility of the soil in most parts of the arid region, and consequent high value of agricultural lands wherever water may be had in quantity sufficient for irrigation, taken in connection with the recent unparalleled development of the fruit-growing industry in southern California and Arizona, make it of the utmost importance to

know beforehand just what crops are likely to prove most successful in each particular place, and point to the advantages that would result from mapping the boundaries of the areas fitted by nature for each of these products; for different parts of the Lower Sonoran zone are adapted not only to the successful cultivation of cotton and tobacco, but also to the needs of the orange, fig, and raisin grape.

Without going into details it may be said, in advance of the forthcoming report on the results of the biological survey of 1891, that the following valleys and deserts have been ascertained to belong to this zone: In California, the San Joaquin Valley, the whole of the Mohave and Colorado deserts, the San Bernardino, San Gabriel, and Santa Ana valleys, and the coast region to the southward except the mountains, the southern end of Owens Valley, Saline, Salt Wells, Panamint, and Death valleys; in Nevada, the Amargosa Desert, Pahrump, Indian Springs, Vegas, Ivanpah, and Virgin valleys; and in Utah, the St. George or lower Santa Clara Valley. The latter was colonized by Mormons many years ago, and the presence of the pride-of-India or China tree, ailanthus, osage-orange, mulberry, flowering cypress or tamarisk, fig, and tobacco trees, along the streets of their thrifty villages was a pleasing confirmation of the bio-geographical position of the valley as ascertained by a study of its indigenous fauna and flora before the settlements were reached.

SECTION OF ECONOMIC RELATIONS.

The work of this section has been confined during the year almost entirely to ornithology, and a large amount of work has been done toward the completion of the bulletins mentioned last year.

The illustrated bulletin on hawks and owls still remains unpublished, through lack of funds to pay for reproducing the colored plates. Meanwhile the text has been thoroughly revised and considerable new matter has been added.

Special effort was made during the past spring and summer to procure the stomachs of old and young crows in corn-planting time and during the breeding season of the smaller birds. About 250 such stomachs were obtained from the District of Columbia and adjacent parts of Maryland and Virginia, while smaller numbers were secured from half a dozen other States. This material is now being examined, and probably will supply most of the data necessary to complete the bulletin on the crow.

Material for the bulletin on crow-blackbirds has been less difficult to obtain than that relating to crows, and already about 800 stomachs are at hand, and more than half have undergone preliminary examination. Other matter for this bulletin has accumulated also, and its publication will follow directly that on the crow.

The collection of stomachs has been very largely increased during the past year, the accessions being nearly twice as great as for the year 1890. This increase is due in part to the special efforts made to secure stomachs of crows and blackbirds, and in part to the increased interest in the work of the division. The collection now contains 13,712 stomachs.

The reference collection of seeds has been augmented by several important contributions, and now numbers 380 genera and 600 species, but still lacks many of the species on which our wild birds feed. Many of our common birds range over thousands of miles in their trips to and fro between their winter quarters and their breeding grounds. Their food during one part of the year may consist largely of fruits and seeds

peculiar to a cold climate, and at another season of the productions of the tropics. It is evident, therefore, that studies of the food habits of such birds present unusual difficulty. A species may be watched in the field by competent naturalists and followed from place to place during its migrations. In addition, stomachs collected at various seasons may be carefully examined by experts in the laboratory. A judicious combination of these methods gives the strongest promise of success, but the laboratory examinations lose most of their value unless a good reference collection of the food materials from the entire range of the bird be kept at hand.

In order properly to identify the fragments of vegetable and animal matter in bird stomachs it was found necessary to prepare for permanent use a series of slides for the microscope, showing sections or bits of the more important materials likely to occur as bird food. Such a collection was begun during the summer, and will be increased as rapidly as circumstances permit.

Considerable attention has been given to the English sparrow question during the year, and it is evident that this bird will continue to be a pest in most sections of the country unless its increase is checked by intelligent action in the different States. Several States have legislated against it ineffectually, their failure being due largely to ignorance of the true habits of the bird and a lack of appreciation of the magnitude and gravity of the evil.

Michigan and Ohio have wasted many thousands of dollars in bounties nominally for heads of English sparrows, but actually in large part for the heads of harmless or beneficial birds. Illinois recently enacted a sparrow law giving bounties for heads during the winter months, but this also can result at best in only a slight diminution of the number of sparrows and at a disproportionate expense.

The sparrow sooner or later will force itself on the attention of every agricultural State in the Union, and it would be the part of wisdom for sections not yet badly afflicted by the scourge to take immediate steps to secure continued immunity. General directions for such action have been given already in the bulletin published in 1889, and it only remains for each State or county to work out the details of the plan which may best suit its peculiar needs. Bounty laws are worse than useless; the best prospect of relief appears to be through the organization in each State of a sparrow board or commission, which shall employ trained assistants to destroy nests and young during warm weather and make use of poison in cold weather, and in such ways as not to endanger the lives of our valuable native birds.